

Reviewing Coventry University's Mathematics Support Centre 2016-17: Ideas and Inspiration

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CASE STUDY

Reviewing Coventry University's Mathematics Support Centre 2016-17: Ideas and Inspiration

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Abstract

The academic year 2016-17 was one of outstanding achievement for the **sigma** Mathematics Support team at Coventry University. We had a further increase in the take-up of **sigma**'s range of services by students from all faculties and our feedback has been enthusiastically positive. Above all, the team has taken some innovative approaches to support and inspire Coventry's ever-growing body of students and staff. This article aims to provide insight into our services and to provide perhaps some inspiration and ideas that other support centres can use.

Keywords: Mathematics support, Statistics support, Coventry University.

1. Introduction

Since 1991, Mathematics Support has been provided at Coventry University by the **sigma** team, which is currently composed of two mathematicians and three statisticians, all of whom are full-time, together with its part-time director. From humble beginnings in a small and difficult-to-reach room, the **sigma** Mathematics Support Centre (MSC) is now a large and welcoming room on the ground floor of the university library (see figure 1). We now have over 10,000 student and staff visits each year and indeed, this past academic year we had 13,670 visits, our highest ever. The 13,670 visits consist of 3026 individual students, therefore each student averaged around 4 repeat visits each. In this article we describe what our MSC offers, how we advertise our services, and hope to provide some ideas and inspiration for other MSCs.



Figure 1: Mathematics Support Centre in Action.

2. Our Services

We offer a range of services to our students and staff across the academic year. Our main service is our drop-in service, which we now offer for more than 50 hours, over 6 days a week in term time.

Figure 2 provides the numbers of students' drop-in visits for the last four academic years. Previously we opened for 7 days a week but found that students were hardly using the service on a Sunday. Furthermore, we found it difficult to motivate any staff members to give up some of their weekend for such low numbers of students. A PhD student currently oversees the support provision on Saturdays, but still the useage is quite low. Figure 3 shows the number of visits by day for 2016-17. Our term-time timetable, a sample of which can be found in appendix A, shows students our tutors' expertise areas, which can be particularly useful if they are looking for some specialist support in mathematical or statistical computer packages (for example). Last year we opened fully, meaning for over 50 hours a week, during the 22 teaching and 4 exam weeks. We also had reduced opening times during holidays, to support students preparing for their exams, and during the summer, for students doing resits and projects. The reduced timetable consisted of weekday support only between 11am and 3pm.

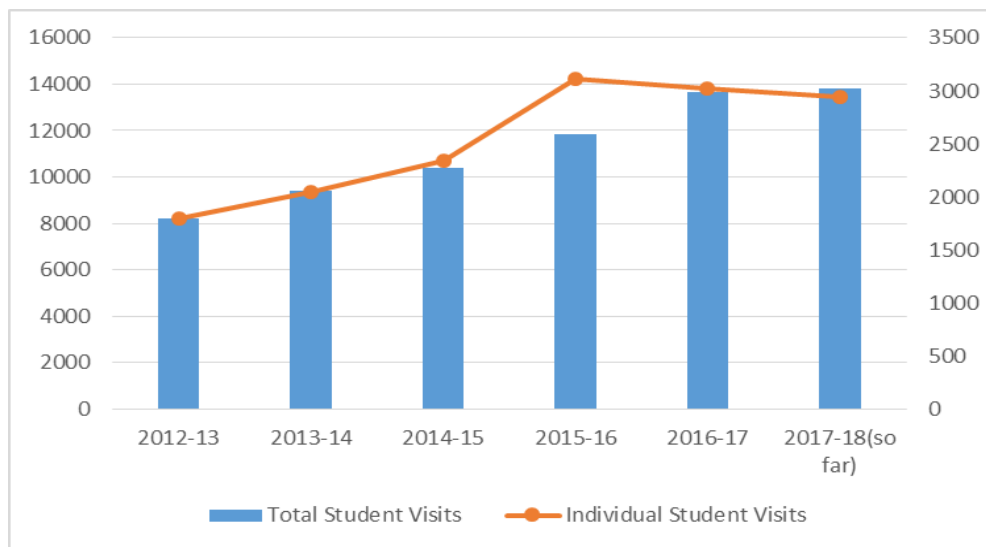


Figure 2: Numbers of student visits for the past five academic years. The blue bars represent total student visits, using the primary axis as the scale and the orange line represents the number of individual students who visit, with the secondary axis as the scale.

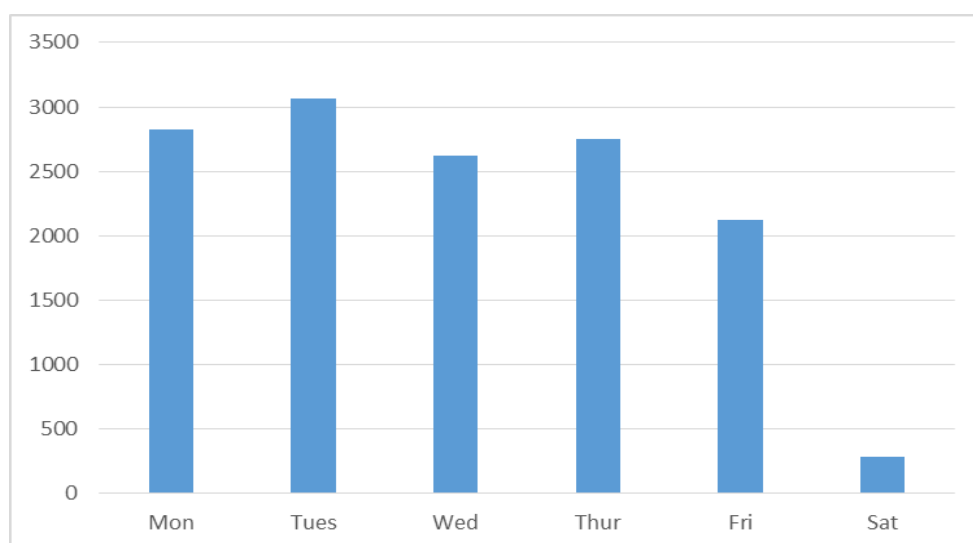


Figure 3: Number of student visits by day.

Within the centre itself, we have 18 computers, various books for reference and two touchscreen computers, which provide print-on-demand worksheets in over 10 different topic areas. To assist us in providing our 50-hour-a-week service, we had about ten undergraduate student proctors who each worked five hours a week on average. We pay our student proctors and, although we are aware that this is not an option for all mathematics support centres, we know that it does provide us with an excellent way of advertising our services to all faculties. Our student proctors attract student visits, especially from those who are perhaps a little shy since some students prefer talking to fellow students rather than lecturers. Our proctors also provide advertising through word-of-mouth which benefits us greatly. A further benefit to having student proctors is that they offer expertise in subjects, such as business and economics, where getting staff members to provide their support can be difficult. Indeed, we tend to recruit students based on demand for a subject area but also where we are lacking in support from staff in a particular subject. All student proctors are recruited subject to having good academic achievement (minimum 2:1 average up to the point they are recruited) and are trained on-the-job for 1 hour a week for the first term with us. Alongside the student proctors, we have three part-time Maths and Stats Support Assistants (MSSAs) who work between 3 and 6 hours per week, and we have two postgraduate students, who work up to 4 hours a week.

In addition, we provide one-to-one, hour-long appointments in both statistics and mathematics. One-to-one appointments are provided to students who feel they need more specialised and focused support from a tutor. We ask students to visit the centre during normal opening hours first to see whether a short intervention from one of our tutors is enough to fix the problem that they have. If they feel the need for more support after this, we direct them to our online booking system to make a one-to-one appointment. Initially these were offered just in statistics but we started offering mathematics appointments for 4 days a week at the start of the 2015-16 academic year. The uptake for this has been very positive with our three tutors hosting over 200 hours of appointments over the past academic year. One-to-one mathematics appointments take place in the MSC, usually before the centre is open for general support, whereas one-to-one statistics appointments generally take place in staff offices. Again, we feel that one-to-ones provide students who are perhaps less inclined to enter the support centre in a crowded environment an opportunity to get the support that they need. However, we have encountered several issues this year with our system for appointments. Firstly, if a student fails to turn up for their appointment, that hour is then lost in the sense that we are unable to offer it to a different student. Our system does allow for cancellations but they need to be made at least 12 hours in advance for another student to be able to take full advantage. Students who do not turn up are asked why they did not show and told about our blacklisting/three-strikes system. Although this stops repeat offenders, it does still take away opportunities for other students who could take the place of the absentee on a particular day. We also found that some students started trying to use the sessions as a free personal tutorial service and had to remind them that the service was not there for that purpose. This is a tricky situation as we want to be encouraging and friendly yet we do not want students to abuse the system at the same time. Similarly, since one-to-one mathematics sessions are held in the centre before the centre is open for general use, other students often walk straight in and expect help despite the centre being closed for drop-ins. Again, this is tricky as we cannot hold all the one-to-ones elsewhere but want to give our full attention to the person who has booked the session. We would be interested to hear from other centres on how they deal with such problems.

Another popular service that we offer is a series of workshops on a variety of topics including SPSS, introduction to statistics, numerical reasoning and preparing for the teaching numeracy skills test. These workshops are provided based on feedback that we receive from students during the year and the number of questions that we receive in a particular topic area. We open the workshops to

all students who feel they need more guidance in a particular topic and work closely with the careers service in the university to advertise and recruit students. The workshops are run like mini tutorials where our full-time staff provide some teaching and theory before inviting attendees to put what they have learnt into practice whilst providing individual support and guidance. All the workshops take place in one of the library's teaching rooms. Running a workshop is pretty straightforward. Once you have done the ground-work for the first session, very little time is required to prepare for future sessions. Again, this promotes our service, who we are and what we do, and since several workshops take place in the centre, the students get to know the centre and recognise it as a friendly place where they can come and get support on mathematics and statistics.

We also provide a diagnostic test in welcome (induction/freshers') week for courses that have substantial mathematical content in order to allow students an opportunity to discover their strengths and weaknesses in mathematics. This test has three levels (Foundation, GCSE, and A-Level) taken according to the mathematical needs of their course and has remained the same for the past 25 years (see Lawson and Danks, 2003). Students take the test in a room allocated by their course lecturers and have one hour to complete the 50 questions on the test. Results are processed by an OMR (Optical Mark Reader) machine and we provide the results (an example can be found in appendix B) to the students in a separate induction talk in the MSC. The results tell the students which topic areas that they need to work on whilst the lecturers get all their individual students' actual test marks and also the marks for each topic area. The result sheets that the students receive also link each topic area to our worksheets. This allows students to come into the MSC and print off the sheets (for free) that they need to work on and receive support if needed.

The final service that we provide is outreach to various departments and schools in the university. Talking to and getting to know staff and students in departments that have courses with mathematical content is vital for running a successful MSC. The issue is that non-mathematicians often dislike mathematics; they did not choose their course to do mathematics and often suffer from anxiety due to a lack of confidence in their mathematical ability (Scarpello, 2007). By being a friendly face that approaches them first, you encourage students, who are not necessarily mathematicians, to visit your centre and realise that it is a place to get support and to enjoy mathematics. Indeed, many of our students stated in our surveys that they wished that they had visited sooner but were too afraid to, thinking that the MSC was only open for mathematics students. In our outreach, we take mini lectures and tutorials in a number of disciplines, including nursing, business, population dynamics, and engineering as well as mathematics. These are usually full lectures to around 70-100 students at a time and are designed in collaboration with the departments that we work with. For example, our nursing lectures take place during a specific 'academic skills week' for first years where the students get training in basic numeracy, literacy and library/research skills. The lectures we take cover basic numeracy skills that are required to be a qualified nurse. These topics are fractions, decimals, percentages, time, ratio, drug calculations and unit conversions. We aim to provide a less formal approach by running games, using online software called 'Socrative', showing videos and supporting students individually as much as possible. We also provide an extensive range of questions using Numbas for them to use in their own time. Feedback from these lectures shows that they are well received and have a positive impact on students' understanding and enjoyment of mathematics. Furthermore, we often see a spike in the number of students from a particular course visiting the MSC after we have run an outreach lecture.

3. Advertising

The key theme running through what we do is advertising. Getting around the university and spreading the word is crucial. We have found that a little bit of hard work and goodwill can go a long way in promoting what we do and getting our 10,000+ visits each year.

One useful method is the utilisation of social media. It has been shown that social media can really boost your MSC's profile and provide a means of communication and advertising to obtain student visits (Collins-Jones, 2016). Our Facebook and Twitter profiles provide students a means of communication and notifications via familiar channels, avoiding the need to check additional sites or applications. Although our social media pages are not currently as successful as those of other institutions (for example, MASH at Bath has 490 likes on Facebook compared to our 77 at the time of writing), feedback from previous surveys that we have operated show that they have helped us to grow and connect with our students. It is also a great way to keep up to date with what is going on in our field and interact with other centres' activities and activities around the campus. We have found that it is particularly helpful on open days to interact with the university's official social media accounts to increase interest in our service from potential new students.

Our website* is our main source of advertising. We have links to our website straight from the university's student and staff portals, as well as our Moodle site. On our website students can also book appointments and workshops, and view or download worksheets as PDF files to use at home. They can also see any news or competitions that we are running and view our timetable. The timetables are also displayed within the centre as well as on big screens inside and outside of the centre. These screens also display relevant information to catch students' attention and can be seen from the entrance of the library.

Another crucial advertising opportunity occurs during welcome week. We, as a team, give induction talks in the MSC to freshers who have some mathematics and/or statistics content in their courses, and we also head out to many introductory lectures to promote our service briefly. Spreading the word early on in the year to the newest students engrains our service as a positive thing to help them. We know this from the feedback that we receive from our long-established calculator surveys that we run every year. Each year we give away free scientific calculators (see figure 4) to first-year students (undergraduate and Masters) that are approved for use in exams. These calculators are funded by the university as part of the budget which is allocated to the MSC. In order to collect their device, they need to come to the MSC after they have completed a short survey on our services. Our name and logo appear on the back of the calculators to remind them of our existence throughout their time at Coventry. In return, we get some valuable questionnaire data on their knowledge of the services that we offer and on their attitudes to, and anxieties about, mathematics when they join the university. Although we tend to get similar results each year, this useful data provides us with evidence for our services that can be used to support any expansion or improvement bids that we make to the university. Furthermore, small tokens like this that have your name and logo on really help the students to remember who you are and what you do. Other examples that we use are little puzzle cubes and pens, which go down particularly well with new members of staff during the new staff induction fairs.

Team **sigma** also runs a stand in the Students' Union, called 'the Hub', on University open days, previously having a central presence there throughout the year. However, our stand for the first post-application open day was very quiet so we decided to change to the MSC, and talked to groups of visitors from the campus tours throughout the day. We believe that getting the message across that we are here to help even before students arrive at Coventry really helps to get students through not only our door, but the university's door also. Furthermore, we attend staff and research student

* <http://sigma.coventry.ac.uk/>

induction sessions which again raises awareness to new university staff members and postgraduates.



Figure 4: Our calculator

4. Evaluation of what we do

Whilst we carry out our day-to-day support activities, we ask students for formative feedback on what we do. Small verbal comments and short emails allow us to evaluate what we do as we go. However, alongside the first year calculator survey mentioned previously, we also carry out an in-depth user survey every two years. The purpose of doing the biennial survey is to obtain formal feedback and data that can be used not only to improve our service, but can also be included in reports published by ourselves, and the library where we are based, to show the university how beneficial having a maths support centre is. Students who use the centre whilst the survey is open are not forced to complete it, however they are gently reminded to take part if they receive some form of support from us. Since we do not force students to take part, we feel this gives us a fair reflection on what we do. The survey is taken either on a computer, either in the centre or at home, or on one of our iPads in the centre, using Bristol Online Surveys (BOS), and consists of around 20 questions. These questions vary somewhat depending on our activities over the previous, or upcoming, two years. Some results of the latest survey taken in 2015-16 are enclosed in appendix C. Here are some verbatim comments:

“...the only thing keeping me on this engineering course and is the only place I feel I can adequately receive help and tutoring...”

“...service is amazing, staff are very friendly. This centre had helped me a lot in my studies.”

“...very valuable resource to have at our university. Has been an absolute godsend...”

and simply “Lifesaving!”

The survey shows that 93% of students (N = 78, representing 3% of total student visits) are happy or very happy with the support that they have received and 100% of students said that they were likely or very likely to return to get more support. 100% of students also stated that they were likely

or very likely to recommend us to their friends and colleagues. Although this only represents 3% of our total student visits for the 2015-16 academic year, it does represent over 20% of our individual student visits during the period that the survey was available. However, we are aiming to improve this during the current academic year, and at the time of writing we have already had 130 students take this year's survey. The difference being that this year we offered a bar of chocolate as an incentive for taking part! Making sure that our students and staff are happy with our service is crucial for sustainability, so regular evaluation is important. Furthermore, it allows us to feed forward to create, implement, and evaluate new ideas.

5. Other activities that are new for this year

The **sigma** National Network: Coventry University's sigma MSC is one of the longest-standing providers of quantitative student support in the UK and its comprehensive services are held up often as an example of good practice in the field. With HEFCE funding for the **sigma** National Network having ended, we have shown our willingness to play a role in, or contribute in some way, to the newly-constituted **sigma** National Network with Dr Mark Hodds becoming a member of the new steering group and running the social media pages. Mark was also involved in creating the new **sigma** MS-MAPS document which helps fellow Maths and Stats Support practitioners gain HEA accreditation. Keeping up with what is going on nationally is vitally important for having a modern and up-to-date service.

Online: We previously offered all students a 24/7 online service called 'HowCloud' for the first time. It allowed students to post a mathematics or statistics question online at any time and then receive an answer within a day. Furthermore, this service also had a live video option that allowed us to tutor students based anywhere in real time. It also gave us the potential to support our students across all of Coventry's campuses. For further details, please refer to Hawkes and Hodds (2016). Despite the promising start, we had a very disappointing overall take-up. The reasons might be:

- Students working on a mathematics or statistics problem want a fast fix. By the next morning, when the answer has been posted on HowCloud, it is too late: they have moved on or lost interest (or missed the deadline).
- The steps that are required to post a question (fire up a device, remember the URL, formulate the problem, type it in mathematical notation) simply presented too much of an obstacle.
- The drop-in centre is easy to get to, in both time and space. Our personalised one-to-one service there takes some beating.
- We had a few technical problems, which meant the posts were not always picked up and answered.
- Students are set in their ways: it takes a long time to change their study habits and receive support.

We decided to discontinue 'HowCloud' due to the above reasons. We are however currently investigating different methods of providing remote support to our satellite campuses in Scarborough and London. We hope this method of online maths support will be available from September 2018.

YouTube: As part of our summer internship offering to students, we invited three student interns to create high quality videos for use on our very own YouTube channel. Thanks to their efforts, we have a bank of around 20 videos so far that we can use support our students further. We are yet to launch our YouTube channel but plan to do so later in the year once we have created some more videos. We would also be keen to share other centres' YouTube videos so please get in touch if you have some!

6. Looking forward

For the forthcoming academic year, we hope to offer an even better service to all Coventry University students and staff, as well as the wider mathematics support network across the UK, as we seek to meet the ever-growing demand for mathematics and statistics support in higher education. To help this, although not fully confirmed, it is highly likely that we will be getting an extension to our existing Maths Support Centre room in the next year, allowing us to increase our service and offer support to more students for longer. We also held a **sigma** national network event on statistics support in April, and hope to offer more over the coming year. We know that we are very fortunate at Coventry to have such a large team of dedicated mathematicians and statisticians, to have the full backing of our mathematics department, and the higher management of the university. We understand that not every university can have the support and resources that we have but we hope this article shows what can be achieved and provides ideas and inspiration to grow your own mathematics and statistics support service.

Appendices

Appendix A – Sample MSC timetable

Mathematics Support Centre Timetable – Spring Semester 2017

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9.00 – 10.00					Damien Foster (201MS support)	
10:00 – 11:00	Sundeep Sehmbi	Katie Baker	Sundeep Sehmbi	Sundeep Sehmbi Cristina Alexandru	Katie Baker	
11:00 – 12:00	Alex Pedecenko Dorothea Kondrat ^c Sundeep Sehmbi	Robert Low Katie Baker Lewis Johnson	Tim Sparks ^p Sundeep Sehmbi Cristina Alexandru	Aiping Xu ^{L,C,T} Martin Weigel Jacob Low Cristina Alexandru	Katie Baker Slim Khan Cristina Alexandru	
12:00 – 13:00	Mark Hodds ^{S,P,L,X,N} Dorothea Kondrat ^c Sundeep Sehmbi	Mark Hodds ^{S,P,L,X,N} Katie Baker Jia Shao ^{P,L,R,T}	Helen Busby Tim Sparks ^p Jacob Low Cristina Alexandru	Jia Shao ^{P,L,R,T} Sundeep Sehmbi Jacob Low	Aiping Xu ^{L,C,T} Katie Baker Dorothea Kondrat ^c Ji Wang	
13:00 – 14:00	Mark Hodds ^{S,P,L,X,N} Sundeep Sehmbi Thierry Platini	Jim Tabor ^{A,L,T} Jia Shao ^{P,L,R,T} Bogdan Teaca	Aiping Xu ^{L,C,T} Sundeep Sehmbi Houshang Mashhoudy ^{S,M,X} Ji Wang	Mark Hodds ^{S,P,L,X,N} Sundeep Sehmbi Jacob Low Cristina Alexandru	Dorothea Kondrat ^c Sergei Molokov Cristina Alexandru	Mark Cummings
14:00 – 15:00	Mark Hodds ^{S,P,L,X,N} Nikolaos Fytas	Aiping Xu ^{L,C,T} Jia Shao ^{P,L,R,T} Michal Kuczynski	Aiping Xu ^{L,C,T} Sundeep Sehmbi Jacob Low Ji Wang	Jim Tabor ^{A,L,T} Mark Hodds ^{S,P,L,X,N} Jia Shao ^{P,L,R,T}	Aiping Xu ^{L,C,T} Jacob Low Ji Wang	Mark Cummings
15:00 – 16:00	Jim Tabor ^{A,L,T} Tim Sparks ^p Cristina Alexandru	Aiping Xu ^{L,C,T} Tim Sparks ^p Michal Kuczynski	Mark Hodds ^{S,P,L,X,N} Jacob Low Cristina Alexandru	Mark Hodds ^{S,P,L,X,N} Jia Shao ^{P,L,R,T} Sundeep Sehmbi	Jia Shao ^{P,L,R,T} Jacob Low	Mark Cummings
16:00 – 17:00	Jim Tabor ^{A,L,T} Tim Sparks ^p Cristina Alexandru	Tim Sparks ^p Bill Dunn Lewis Johnson	Mark Hodds ^{S,P,L,X,N} Robin de Regt Michal Kuczynski	Bill Dunn Sundeep Sehmbi Cristina Alexandru	Bill Dunn Jacob Low	Mark Cummings
17:00 – 18:00	Brian MacDonald Michal Kuczynski	Bill Dunn Lewis Johnson Damien Foster (201MS support)	Jacob Low Robin de Regt Michal Kuczynski	Jia Shao ^{P,L,R,T} Bill Dunn	Bill Dunn Michal Kuczynski	
18:00 – 19:00	Brian MacDonald Michal Kuczynski	Bill Dunn Michal Kuczynski	Jacob Low Joseph Yose ^{X,Y}	Sundeep Sehmbi		
19:00 – 20:00	Brian MacDonald Michal Kuczynski	Bill Dunn Michal Kuczynski	Jacob Low Joseph Yose ^{X,Y}	Sundeep Sehmbi		

Key

Name in Green = Statistician Name in Purple = Engineering Specialist M = Minitab support L = LaTeX support R = "R" support Y = Python P = SPSS support
X = Excel support T = Matlab support S = Stats and Maths support A = Maple support C = Logic and sets N = Nursing Support
Please note: All tutors are able to offer support in basic mathematics for ANY subject. However, if you wish to get some more specific support then please see a tutor who is able to offer that support using the key above.



sigma (Maths and Stats Support)



Mathematics Diagnostic Test Results for:

«Candidate_Name»

Arithmetic:	«Arithmetic_Arithmetic_Grade»
Problem Solving:	«Problem_Solving_Problem_Solving_Grade»
Further Arithmetic:	«Further_Arithmetic_Further_Arithmetic_Gr»
Algebra:	«Algebra_Algebra_Foundation_Grade»
Lines and Curves:	«Lines_and_Curves_Lines_and_Curves_Grade»

Dear «Candidate_Name»

It is very important that you are well prepared mathematically for your degree course. The Diagnostic Test shows which areas need revision to get you up to speed. Individual tutoring is freely available in **sigma's Mathematics Support Centre (MSC)** on the ground floor of the University Library. The Centre is open seven days a week in term time. Just drop in and ask one of our friendly tutors for help – no appointment is necessary. We have prepared some worksheets that will help you revise. Hard copies are available in the Centre and they can also be downloaded as PDFs from our website: <http://sigma.coventry.ac.uk/> The worksheets are numbered and the ones relevant to the above topics are listed at the bottom of this letter.

Throughout October we also offer first year students a **FREE Calculator**. All you need to do is complete our short survey which can be found on our website. Once you have completed the survey you need to bring your ID card to the centre **between 12pm and 2pm** on weekdays to claim your free calculator (whilst stocks last!). **Please allow 24 hours from completing the survey to collecting your calculator.**

We look forward to seeing you regularly in the Centre throughout your degree years. It's a place to come and work in a supportive atmosphere, and get help when needed. Improving your maths, even if you are already good at it, will almost certainly help you get a better degree.

Best wishes,

The **sigma** Team

Worksheets to help you catch up in the topics needing revision:

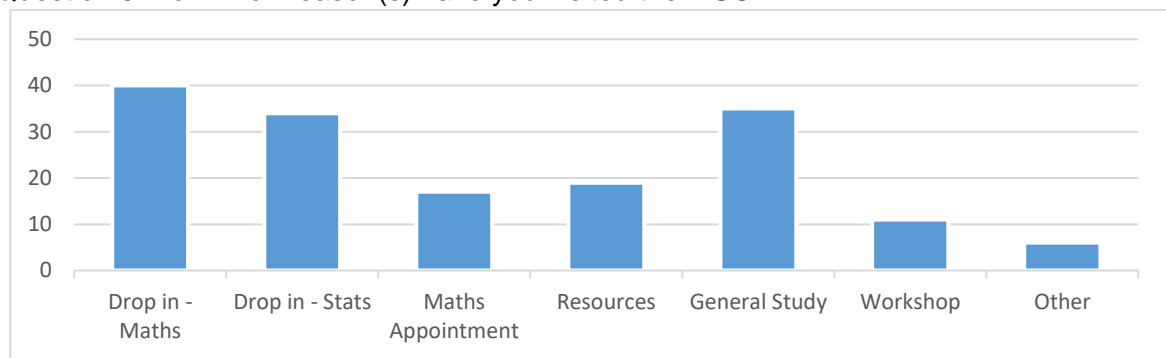
- | | |
|----------------------|-----------------------------|
| • Arithmetic | N1, N2, N3, N5 |
| • Problem Solving | N4, N7, N8 |
| • Further Arithmetic | N6, N13 |
| • Algebra | A2, A3, A4, A5, A8, A9, A17 |
| • Lines and curves | G3, G4, G5, G6, G7 |

Mathematics Support Centre Opening Times

Monday	10am – 8pm
Tuesday	10am – 8pm
Wednesday	10am – 8pm
Thursday	10am – 8pm
Friday	10am – 6pm
Saturday	1pm – 5pm

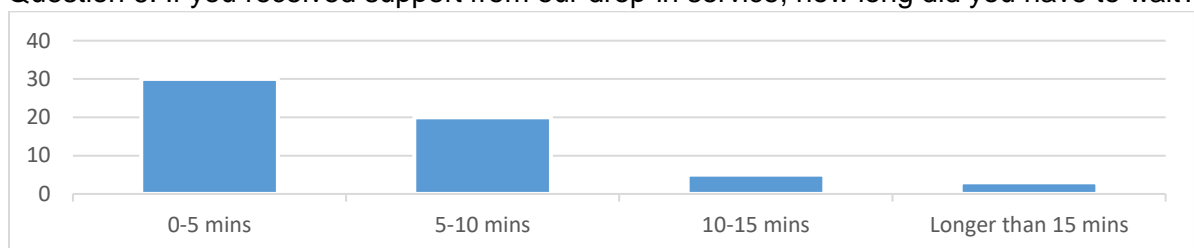
Appendix C – Some statistics from our Feedback Survey 2015-16 (N = 78)

Question 5: For which reason(s) have you visited the MSC?

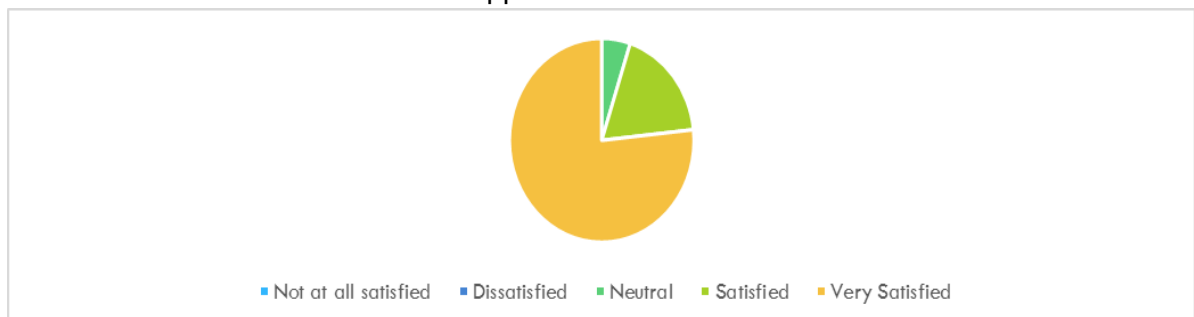


('Other' corresponds to picking up leaflets and worksheets, working as a student proctor, and collecting coursework from tutors.)

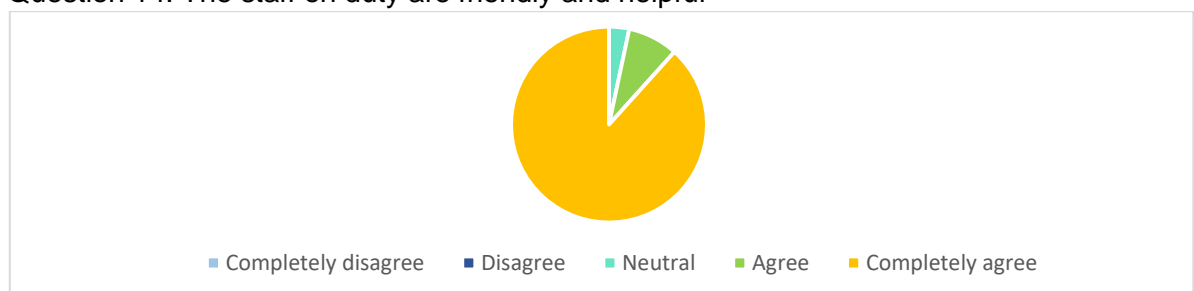
Question 6: If you received support from our drop-in service, how long did you have to wait?



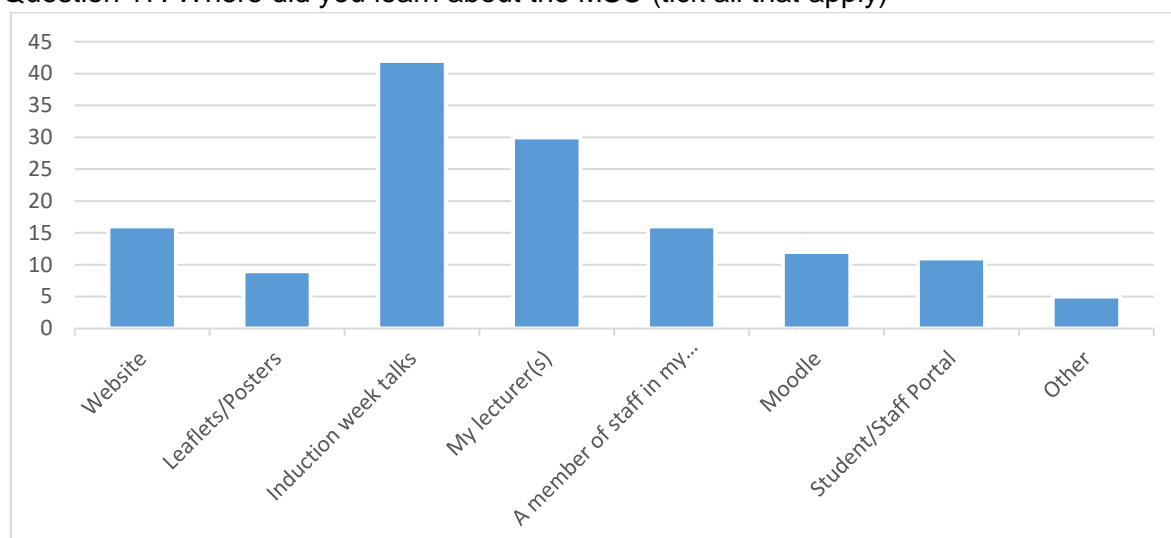
Question 8: I am satisfied with the support I received



Question 14: The staff on duty are friendly and helpful



Question 17: Where did you learn about the MSC (tick all that apply)



('Other' corresponds to Social Media and Open Day talks.)

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